

REMARKS

Claims 1, 3, 7, 9, 10 and 12 are pending in this application. Claims 1 and 3 have been amended. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure. Applicant submits that the present Amendment does not generate any new matter issue.

Claim 1 was rejected under 35 U.S.C. §103 for obviousness predicated upon Fernandez et al. in view of Shermer et al.

In the statement of the rejection the Examiner admitted that Fernandez et al. fail to disclose that the heat sink plate has concavo-convex portions on the exposed surface thereof. Nevertheless, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify the device of Fernandez et al. to provide such concavo-convex portions in view of Shermer et al. This rejection is traversed.

There is a significant difference in structure between the claimed invention and each of the applied references that undermines the obviousness conclusion under 35 U.S.C. §103. Specifically, in accordance with claim 1, the heat sink plate has a broader area than the main surface of the semiconductor chip. Moreover, the heat sink plate is fixed by the sealing member and disposed so as to be detached from the substrate. These features are neither disclosed nor suggested by the applied prior art. Ergo, even if the applied references are combined, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

Further, the above-argued differences between the claimed invention and the applied prior art are functionally significant. Specifically, by forming the heat sink plate with a broader area than the main surface of the semiconductor chip, heat generated in the semiconductor chip can be radiated more efficiently. In addition, because the heat sink plate is fixed by the sealing member and disposed so as to be detached from the substrate, the heat sink plate is not required to be fixed to a substrate, i.e., the heat sink plate is not required to be bent so as to be fixed to the substrate. Therefore, the heat sink plate can be fixed by the sealing member at the same time of encapsulating the semiconductor chip on the substrate, without special processing and without the use of a special member for attaching the heat sink plate. Accordingly, manufacturing costs of the semiconductor device are lower.

Based upon the foregoing, Applicant submits that the imposed rejection of claim 1 under 35 U.S.C. §103 for obviousness predicated upon Fernandez et al. in view of Shermer et al. is not factually or legally viable and, hence, solicits withdrawal thereof.

Claim 3 was rejected under 35 U.S.C. §103 for obviousness predicated upon Hembree in view of Tao et al. and Shermer et al.

In the statement of the rejection the Examiner acknowledged differences between the claimed invention and Hembree's device, but concluded one having ordinary skill in the art would have been led to modify Hembree's device to provide external connections in view of Tao et al. and further to preclude the convex portions protruding from the sealing member in view of Shermer et al. This rejection is traversed.

There are significant differences between the semiconductor device defined in claim 3 and the applied prior art that undermines the obviousness conclusion under 35 U.S.C. §103. Specifically, the semiconductor device defined in claim 3, comprises, inter alia, a heat sink plate which has a broader area than the main surface of the semiconductor chip. Moreover, the heat sink plate is fixed by the sealing member and disposed so as to be detached from the substrate. These features are neither disclosed nor suggested by the applied prior art. Ergo, even if the applied references are combined, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp., supra.*

Moreover, the above argued differences between the claimed semiconductor device and the applied prior art are functionally significant. By forming the heat sink plate with a broader area than main surface of the semiconductor chip, heat generated in the semiconductor chip can be irradiated more efficiently. In addition, because the heat sink plate is not required to be fixed to the substrate, it is not required to be bent to be fixed at a substrate and, therefore, the heat sink plate can be fixed by the sealing member at the same time of encapsulating the chip on the substrate without special processing and without the use of a special member for attaching the heat sink plate. Accordingly, manufacturing costs of the semiconductor device are reduced.

Based upon the foregoing, Applicant submits that the imposed rejection of claim 3 under 35 U.S.C. §103 for obviousness predicated upon Hembree in view of Tao et al. and Shermer et al. is not factually or legally viable and, hence, solicits withdrawal thereof.

Claims 7, 9, 10 and 12 were rejected under 35 U.S.C. §103 for obviousness predicated upon Schneider et al. in view of Tao et al. and Oogaki et al.

This rejection is traversed as legally erroneous. Applicant submits that the Examiner did not make the requisite "thorough and searching" factual inquiry or offer a technological basis to explain **why** one having ordinary skill in the art would have been realistically impelled to modify the particular device disclosed by Schneider et al. by providing an engageable/detachable dissipation film in view of Oogaki et al. *In re Lee*, 237 F.3d 1338, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

The Examiner's reason for modifying the semiconductor device disclosed by Schneider et al. by providing an engageable/detachable heat sink fin is found in the ultimate paragraph on page 7 of the April 10, 2003 Office Action and read as follows:

Oogaki et al. disclose the heat sink 7 and the heat sink 8 have engaging portions brought into engagement each other, whereby the engaging portions allow detachment of the heat sink 8 from the heat sink 7 (cover fig., column 4, lines 1-10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Schneider et al. and Tao et al. to provide the engaging portions to achieve a positive cooling effect for the package device, as shown by Oogaki et al.

The Examiner's reasoning does not withstand scrutiny. Specifically, as emphasized in the responsive Amendment submitted January 23, 2003, the device disclosed by Schneider et al. **already has positive cooling**. The engageable/detachable portion of the device disclosed by Oogaki et al. would **not** add positive cooling to the device disclosed by Schneider et al., **because it already has positive cooling**. On this basis alone, the Examiner's reasoning does not withstand scrutiny.

Further, the heat sink 8/heat sink 7 disclosed by Oogaki et al. is not provided solely for being engagement or disengagement, as the Examiner implicitly suggests. Rather, the **reason** for providing second heat sink 8 which is engageably held by the first heat sink 7 in the device disclosed by Oogaki et al. appearing on the face page of the patent, is to **accommodate a variation in the distance (c)** between the electronic parts 4 and the heat sink 7, such that minute **compensation** can be made with ease by turning the threaded heat sink 8 (column 4 of Oogaki et al., lines 23 through 26). Applicant previously argued, and **the Examiner does not deny**, that in the device disclosed by Schneider et al. there is **no variation in distance between the planar substrate 10** because the planar substrate 410 is bonded to the die 306 using adhesive 412. Further, even **if** there was a variation in distance, such could **not** possible be accommodated by bringing fin 414 into contact with the die 306, because it would be **blocked** by the planar substrate 410. Here, again, the Examiner's reason to modify the device of Schneider et al. achieves **no** objective based on facts.

Moreover, the heat radiator disclosed by Oogaki et al. functions by conducting heat to the shield case 5--**an element which does not even exist in the semiconductor device disclosed by Schneider et al.** It is for the purpose of conducting heat to the shield case 5 that the first heat sink 7 is provided and the second heat sink 8 formed such that it is engageably held by the first heat sink 7, thereby providing a conductive path directly to the shield case 5, **again an element does not exist in the device disclosed by Schneider et al.** This is another reason why the Examiner's proposed modification of the device disclosed by Schneider et al. would not serve any apparent purpose, based upon facts.

It should, therefore, be apparent that the Examiner's reasoning underpinning the asserted motivation is without technological basis. Rather, it would appear that the Examiner has improperly identified features in disparate references and then asserted the obviousness conclusion. This approach is legally erroneous. *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *Grain Processing Corp. v. American-Maize Products Co.*, 840 F.2d 902, 5 USPQ2d 1788 (Fed. Cir. 1988). The only basis to support the requisite motivation is found at Applicant's disclosure which, of course, is forbidden territory upon which the Examiner may trespass in order to excavate for a reason to modify a reference. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985).

Based upon the foregoing, Applicant submits that the imposed rejection of claims 7, 9, 10 and 12 under 35 U.S.C. §103 for obviousness predicated upon *Schneider et al.* in view of *Tao et al.* and *Oogaki et al.* is not factually or legally viable and, hence, solicits withdrawal thereof.

It should, therefore, be apparent that the imposed rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

10/057,923

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Arthur J. Steiner', is written over the printed name.

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